

## **REMARKS**

As a preliminary matter, Applicants wish to thank Examiner Sara Crane for her courtesy in granting an interview, which was conducted March 11, 2004, to discuss the above-identified Application. The telephonic interview, which included Examiner Crane and Applicants' attorney Arik Ranson, included discussion of claims 1, 2, and 4-8 as well as the Forbes reference. No agreement was reached regarding the patentability of the pending claims. However, the Examiner indicated that claim 2 would be allowable if rewritten in independent form, and further indicated that claims directed to single particle tunneling associated with irradiation of light would be patentable over the prior art based on her search of the art to date.

Regarding the 35 U.S.C. §112, first paragraph rejection of claims 5-7, the Examiner submits that the SEM device shown in FIG. 1 of the present Application is not a transistor because, according to the Examiner, it lacks voltage change in a third (gate) terminal providing a change of I-V relationship between the source and the drain. Accordingly, the Examiner posits that the SEM experimental results for the device shown in FIG. 1 and related FIGs. cannot be extended to the transistor shown in FIG. 6, and apparently in the Examiner's opinion, claims 5-7. As to the prior art rejection based on the Forbes reference, the Examiner indicated her belief that, reading Forbes in "the broadest reasonable light", the phrase "uniform distribution of particle sizes" refers to particles of uniform size. In spite of Applicants' attorney's submission that Forbes clearly refers to a distribution of particle sizes, and not a uniform size *per se*, no agreement was reached on this issue.

To further prosecution of this case, Applicants respectfully submit new claim 9, which is claim 2 rewritten in independent form, but without the word "transistor". As the Examiner has indicated that such a claim would be allowable, Applicants respectfully request consideration and allowance of this claim. Further, Applicants submit additional new claims directed to single particle tunneling by irradiation of light, as suggested by the Examiner, and respectfully submit that these claims are also allowable over both the references of record and, apparently, all references reviewed as a result of the Examiner's search.

Claims 1 and 4-8 remain rejected. Applicants respectfully traverse the pending rejections of these claims for at least the following reasons.

Regarding the Office Action's §112, first paragraph rejection of claims 5-7, Applicants respectfully submit that all features in the claims as written are clearly, and explicitly, supported in the specification and drawings as filed. The Examiner has stated, "undue experimentation would be required to generalize the results of Applicants' FIG. 1 to reduce a transistor having the regions recited in the claims". However, Applicants respectfully submit that claim 5, for example, is directed to a method for operating a single electron device which has a source, a drain, a gate, and 1 nm diameter silicon nanoparticles.

The specification as filed directly links the experiments conducted in the Application with the terms provided in the claims. For example, page 7, lines 2-4 specifically provide that the experimental device of FIG. 1 models the action of an FET transistor using a scanning tunneling microscope. Further, line 8 of the same page states specifically that "in this two terminal arrangement, the tip 12 acts as the source, while the substrate 16 acts as the drain." Additionally, page 7, lines 11-14 indicate that particles 18 represent the quantum well. The I-V spectra is taken while the voltage of the tip is varied with respect to substrate 16. Page 8, lines 15-24 indicate the effect of light stimulation on the FIG. 1 experiment, where film 14 contains nanoparticles 18 stimulated by the light from a mercury lamp. An additional I-V response, shown in FIG. 4, shows the result of the light stimulation.

As claims 5-7 are directed to a single electron device, which is clearly shown in FIG. 1 and the associated disclosure, the Office Action's objection therefore, is apparently directed to the use of the terms "drain", "source", and "gate" as applied to a two-terminal device. In fact, the still pending final Office Action states that "one of ordinary skill would not understand 'source' or 'drain' to refer to electrodes such as those of FIG. 1. The terms refer to transistor regions." However, as Applicants have specifically cited these parts, using this very lexicon, in the Application, Applicants respectfully submit that the burden has now shifted to provide support for the submission that a two-terminal device cannot have a

source, drain, and gate.

To the extent the Office Action submits that these terms have such a rigid definition as to directly contradict Applicant's submitted statement otherwise, Applicants respectfully request evidence to support what appears to be official notice. In other words, Applicants respectfully request support showing that the parts identified in the experiments submitted by Applicants and specifically described as "source", and "drain", cannot actually be these features. Absent such evidence, Applicants respectfully request that the rejection be reconsidered and withdrawn.

Regarding the pending prior art rejection, Applicants mention that previous submissions regarding the other references of record (specifically, Chen and Pankove), have to this date remained unanswered. Forbes appears to be the sole basis for the Office Action's finding of 1 nm silicon nanoparticles in the prior art. Applicants again traverse the Office Action's reading of Forbes, as it appears contradictory based on a careful reading of the reference.

In response to Applicants' previous submissions regarding Forbes, the Office Action responds, "uniform size means uniform size". While this statement on its face may be correct, it is also irrelevant with respect to a reading of Forbes in its proper context. The only significant mentions of uniformity in Forbes appear to be provided at col. 4, lines 13-14 ("the silicon crystals can be made in a variety of sizes with a uniform distribution in particle sizes by appropriate anneal conditions") and col. 4, lines 65-66 ("and are in a uniform size distribution for a particle set of processing conditions"). While the Office Action appears to focus solely on the terms "uniform size" in the phrase "uniform size distribution", such a reading ignores the term "distribution" without explanation, and completely discounts the directly paired phrase "uniform distribution in particle sizes".

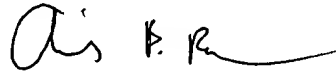
Interpreting both of these phrases to mean that a number of particle sizes are provided in a uniform distribution is the only reasonable interpretation of these phrases. More specifically, it is the only interpretation that is consistent with both cited portions of the specification, it is the only interpretation that explains the somewhat broad and vague stated

range of 10 angstroms to 100 angstroms, and it appears to be the only interpretation backed by an enabling disclosure. Applicants have provided documentation explaining the term “uniform distribution”, and this explanation meshes perfectly with the disclosure provided in Forbes. This interpretation also is completely consistent with claim 3 of Forbes, defining that a plurality of silicon particles each have a general diameter in a range of about 10 angstroms to 100 angstroms. A reasonable reading of Forbes would suggest that this 10 angstrom to 100 angstrom range is produced by the annealing technique shown in Forbes, and a uniform 1 nm size would not be shown, suggested, or enabled by Forbes (or the other art of record, apparently). The “broadest reasonable interpretation” of a reference can be broad, but it must also be reasonable. To ignore the term “distribution” in Forbes appears to be patently and latently incorrect.

In sum, the Office Action apparently still has not provided a teaching in the prior art, including Forbes, Chen, or Pankove that teaches, suggests, or enables generation of 1 nm silicon nanoparticles. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection.

For at least the foregoing reasons, Applicants believe that this case is in condition for allowance, which is respectfully requested. The Examiner should call Applicants’ attorney if an interview would expedite prosecution.

Respectfully submitted,  
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April 5, 2004

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